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DISEASES OF THE NERVOUS SYSTEM

A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

CONTENTS:

A STATE PROGRAM OF ELEEMOSYNARY CARE 5
Paul L. Boynton, Ph.D.

ANALYSIS OF NEUROPSYCHIATRIC REJECTEES FROM THE STATE OF TENNESSEE 9
Comdr. Orman C. Perkins, MC, USNR

NEUROTIC BEHAVIOR PATTERNS ARISING OUT OF THE COMBAT SITUATION 19
Lt. David B. Vinson, Jr., USAC

NEUROLOGICAL CLINICAL PATHOLOGICAL CONFERENCE 23

THE FEAR-ALLAYING EFFECT OF PENTOTHAL SODIUM IN ELECTRO-SHOCK THERAPY 27
H. S. Rubinstein, M.D., Baltimore, Maryland

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DISEASES of the NERVOUS SYSTEM

(PUBLISHED MONTHLY)

A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

A State Program of Eleemosynary Care*

PAUL L. BOYNTON, Ph.D.**

In this brief exposition it is manifestly impossible to do more than refer to a few major features in a program as broad as this must be. This discussion will take up only three types of eleemosynary services. These relate to mental health, delinquency and sensory defect. This means that other items, some of definite importance, cannot be introduced for consideration.

I can spend little time considering physical plants of state institutions or of standards relating to the qualifications of institutional personnel or specific internal facilities. Institutional services cannot exceed in effectiveness the efficiency of the professional and attendant personnel, who must have at hand adequate diagnostic, treatment, educational, utility, and housing facilities in order to yield maximum benefit.

First, it is my opinion that each major division of a state's public eleemosynary services should be under the direct control and supervision of a professionally trained and technically qualified director who should be a strong administrator with several years experience in the administration of state institutions of the type he would supervise. He should have thorough technical training in his specific field, and, in the case of the Director of Mental Health, should have established himself as an outstanding psychiatric practitioner. Under the direction of a man of this type one could expect a concentration of attention on the hygienic, clinical, educational and/or therapeutic aspects of the program in opposition to that which one finds in far too many states today where the major emphasis seems to center on custodial care.

Second, each major group of eleemosynary services should have a State Board or Commission composed of outstanding persons not employed by the State in any other capacity. This board would be a tremendous aid in selling an adequate program to the people, and in keeping the institutional activities closely attuned to public needs. I am quite cognizant that lay boards, or even combined lay-professional boards, can develop tendencies and practices which are incompatible with the fundamental needs of the institutions they serve. Unless their duties and functions are carefully prescribed in the law which creates them, it is easy for such bodies to arrogate to themselves authority they are not qualified to use in a helpful manner at all times. Nevertheless, all of us are familiar with the fact that in many, if not most states, the eleemosynary program operates in comparative isolation from the public. The average citizen knows little more than that his state maintains one or more mental institutions, and, incidentally, he likely knows them only as "insane asylums," and refers to them only in jest. In turn, he looks with sympathy but little understanding at the schools for the blind and deaf, while the so-called reform schools are to him largely inhabited by hardened young criminals, perverts, and morons.

It is my impression that many who are vitally and sincerely concerned with better services in these areas do not themselves stop to recognize the isolation of their own

*Read at meeting of Texas Mental Hygiene Association, Austin, Texas, March 8-9, 1945.

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programs. The fact, for example, that most of the public has not been educated to think of mental illness merely as illness instead of a form of individual and family disgrace results in a condition where very few families of patients are willing to make a strong popular appeal for improvement of services. The training schools for boys and girls, unlike educational institutions, have no "rooting sections" ready to "die for dear ol' Rutgers," nor do they have strong alumni organizations of prominent citizens to which they can appeal, in order to bring the justice of their requests to the attention of the people and their duly elected representatives. The schools for the blind and deaf are more likely to excite public sympathy than to stimulate public study.

So as I look at this matter, it is absolutely essential that a strong link be developed and maintained between the professional services in these areas and the people who both maintain them and are served by them. I know of no way in which this can be accomplished quite so effectively as through the channel of a board of outstanding citizens. Some might prefer to make such a body purely advisory in nature, investing it with no executive functions. Still further, some might prefer to have a definite per cent of the board's personnel specifically designated as technically trained welfare workers, clinicians, and/or practitioners. These are details which can be worked out. To restate the main thesis, it is that some form of regularly established and continuing State Board or Commission, assigned to each major eleemosynary field, and composed of persons not in state employ, is the most feasible and certain manner of linking a state's public eleemosynary services to the people who support them, and when the need arises should be served by them.

Third, it is my opinion that in most states the eleemosynary services are too institutionalized. In furtherance of this idea I wish to divide this phase of the discussion in three parts. First, are matters relating directly to mental health and retardation, next are matters pertaining to delinquency, and finally are matters pertaining to those with sensory handicap. In most states little is being done in this field by way of prevention or by way of treatment of mental illnesses in their incipient stages. There is much to be done that is highly desirable if we are looking to the prevention of mental illness in fact as well as in word. The problems of mental health and psychiatric therapy have been presented to the public in many, many instances in a manner strongly reminiscent of the days of witchcraft, or cloaked in an aura closely akin to that of crystal gazing or the reading of tea leaves. When I listen to and read some of the discussions in this field in which there are manifest attempts to transform everyday knowledge into a sacrosanct body of scientific data by the mere process of substituting a scientific sounding vocabulary for the simple terms of ordinary speech, I often wonder why we resort to such tactics in a field of so much consequence to ordinary human beings. When we come down to actual facts, and are fair with ourselves and our fields of professional concern, I believe all will admit that the basic element in any adequately conceived program of mental hygiene is proper education. The mental hygienist, if he actually is a hygienist and not a therapist, is concerned fundamentally with prevention. If prevention is the primary burden of a mental health program its primary matter must be education.

Education, of course, must be broadly conceived. It must encompass the most powerful of all educational forces acting on the developing individual, that which comes from within the home and family. At the same time, it must not overlook the school itself. Too frequently we have overlooked the fact that modern education gives practically no guidance or training designed to aid in solving the preplexing problems of daily life. Too frequently when we give any consideration to this problem we conclude that the child is too young to be taught the profound truths of this new science of mental health. That may be correct. We do know, though, from centuries of experience, that he is not too young to learn the profound practices of mental ill-health. Furthermore, a study such as that which Guy and I reported a few years ago in which the average patient in a fairly large state mental hospital had from two to four years more scholastic training than that of the average citizen of the state in which the institution was located, makes us wonder

whether we will ever make a fundamentally significant, consequential contribution to public mental health until we quit our shadow boxing and reduce our findings to simple, understandable facts which can be made part and parcel of the public school curriculum. In fact, I should say that any state mental health program which aims to get at fundamentals of prevention, and not concentrate solely on techniques of therapy, will have to be developed in the closest of cooperation with the state department of education, and any other agencies directly concerned with the education and training of youth.

If we shift our interest from the preventive to the therapeutic aspects of our program, but at the same time continue to consider ways by which we may prevent too much concentration of attention on the matter of routine institutional care, I think every established mental hospital should have and should give wide publicity to an efficient out-patient service. This probably should be developed in a separate building, with special equipment, and, if possible, a special staff. Along a comparable line of thought, I must confess a very strong feeling of support for traveling clinics, if they do not attempt to cover too much territory, and if they are properly staffed. Under these conditions they can serve as aids to local peace officers and welfare agencies in addition to handling certain problems more directly concerned with the mental health of citizens in the region. If properly directed, they can cooperate with local physicians so as to provide a form of internship or in-service training for the physician whose education in this field was never extensive and who otherwise cannot keep abreast with modern developments, though he is daily called upon to recognize or even treat persons suffering with mental illnesses of some type, or deviating from the mental norm in some manner.

To return to the hospital itself, I think that not only should voluntary commitment be possible, but also voluntary submission for observation without commitment. We must admit that in public thinking too many feel that formal commitment, by whatever process, stigmatizes the individual. If, however, the public could be made to realize that any person who wished to do so could go to a state hospital merely for observation and diagnosis we probably could prevent many forced commitments at a later date.

One last point in this connection pertains to the incorporation of more specific psychiatric training in medical education. In fact, since many of the problems of all practicing physicians, whether they are general practitioners or specialists, have certain neurotic or psychotic involvements, I should like to see all physicians required to serve at least a three months internship in a recognized mental hospital.

All of these latter points relate to the treatment of mental illnesses in incipient form. So long as our mental health programs are geared in their entirety to the conventional mental hospitals we shall never assist the vast per cent of the public which needs qualified professional assistance. In fact, I sometimes think that carrion-like current programs in most states are merely hovering over the public waiting to pick up the victims of mental dissolution, instead of concentrating on the two most important factors, namely, prevention and treatment in incipiency.

If we turn now to the matter of behavioral maladjustment, or delinquency, I should like to mention an item rather closely related to the points just discussed. I refer to the need for a planned distribution of child guidance clinics. These clinics, of course, need highly competent staffs, both administrative, psychological, medical, social, and psychiatric. Such clinics, located strategically, would serve effectively in salvaging and rehabilitating many boys and girls now being thrown to the wolves of paternal ignorance, social neglect, and youthful impulses. Larger and better reform schools will not settle the problem. We also know that most of these delinquencies are committed by youngsters who are seeking more effective and personally enjoyable methods of expressing their normal urges and satisfying their youthful interests. In other words, the problem resolves itself into one of ignorance or lack of training of the child, and misguidance or lack of guidance on the part of society. Furthermore, until we recognize delinquency as but one aspect of behavior, and, as such, subject to the same principles which govern all behavior, our ef-

forts to cope with it, though sincere in origin, will be characterized by much misdirected energy. Child guidance clinics cannot solve the entire problem of behavioral maladjustment or delinquency. At the same time, however, they constitute one definite, tested procedure which when used properly are certain to make a major contribution to individual betterment in this field.

As to those persons with sensory defects, I do not want to be misunderstood. I definitely favor special schools for the blind and deaf. Nevertheless, I think that these schools should be but a part of the program. For example, if a school for the deaf is well equipped and sincerely working to that end, there is little reason for keeping the average deaf child in the institution throughout his scholastic career. I realize, of course, that there will always be a small residual group of regular institutional cases, but with proper training in lip reading and speech the average child in most schools for the deaf probably can return to the more normal environment of the public school after a very few years. With respect to the so-called blind, we know that only a very small per cent of these individuals are actually blind. They simply do not see well enough to justify them in continuing under normal school conditions. If sight saving classes were more numerous, many of these persons could be saved from some loss of vision, and some now institutionalized could be retained in the general school population. No individual should be institutionalized unless he will profit by this experience, or unless he is an actual menace to society. I am afraid, though, that in the field of sensory defects society has been quite prone to institutionalize in the meaning "get rid of". Under the program suggested we would not need larger and larger institutions, but in lieu of them would offer broader and broader services.

Lastly, I should like to mention an aspect of a state program in the eleemosynary fields in which I have seen far too little interest over a large part of the United States. I refer to a systematic, planned program of research. Perhaps a suggestion such as this sounds visionary or impractical. I can even hear some say, "That sounds like a college professor". But let us proceed. It is my impression that, at best, most state institutions are consumers of knowledge but seldom contributors to knowledge. On the other hand, I believe you will find that wherever a planned program of research is in operation a highly effective program of individual treatment, care, and rehabilitation accompanies it. The true, scientific research worker is intolerant of any procedure in his field until he has tested it under exacting and controlled conditions. He does not accept the past merely because it is difficult to disinter its mistakes. Though he may practice mediocrity, he is never content with it, and is constantly checking it against new and different procedures in order to find a more effective substitute. Human welfare is impossible to evaluate in dollars and cents. Nevertheless, it is my belief that in terms of human welfare, one of the cheapest things any state could do would be to invest at least 5 or possibly 10 per cent of its total eleemosynary budget in a program of systematic research designed to consider the prevention, treatment, and care of mental illness and abnormality, behavioral maladjustments, and sensory defects.

By way of recapitulation, this discussion has centered on four points. These are: (1) a highly qualified, professionally trained state director in each of the major areas of eleemosynary services; (2) a State Commission or State Board, composed of outstanding citizens, to serve each major branch of these services; (3) a "deinstitutionalized" program, one in which the principles and practices of mental hygiene and mental therapy, the methods of prevention and control of delinquency, and the techniques of sensory conservation and rehabilitation will be carried to the people, one more designed to preserve and conserve than to house or even restore; and (4) a research program so constituted that it will strive at all times to develop new and better methods in each field in lieu of blindly copying the mistakes of the past. Any state which would develop a program of this type would be acquitting itself well in the handling of its basic obligations in these areas of human need. In fact, I would be willing to say, "Seek ye first these conditions, and all other factors shall be cared for in due season".

Analysis of Neuropsychiatric Rejectees from the State of Tennessee

COMDR. ORMAN C. PERKINS, MC, USNR

This study represents an analysis of the neuropsychiatric rejections at the Armed Forces Induction Center, Fort Ogelthorpe, Georgia, covering a period from January 1 to March 19, 1944. The physical examination at this station was carried on by means of "the assembly line technique". Psychiatric observation was necessarily of a very informal nature and the neurological examination was not routine, but was done when indicated. The object was to eliminate as early as possible those unfit for service on account of neuropsychiatric conditions or those who were likely to develop such conditions and thereby become serious liabilities to the Service. The types of individuals were considered unfit for service according to standards set up by the Selective Service which may be grouped as follows:

1. Persons of too low a level of intelligence.
2. Persons with obvious neurological conditions.
3. Individuals with frank psychosis of whatever nature (or with a history of psychosis).
4. Individuals with fully developed neurotic conditions.
5. Generally unstable persons who have shown marked difficulty in adjusting to the demands of ordinary civilian life.
6. Individuals whose sexual behavior is such that it would endanger or disturb the morale of the military unit.
7. "Prepsychotic conditions," i. e., early manifestations of psychosis which are likely to lead to frank psychotic expression later. To this group should perhaps be counted the paranoid personalities.
8. Chronic alcoholism. Drug addiction.
9. Individuals who show certain psychosomatic syndromes. (Effort syndrome, certain gastro-intestinal and circulatory disturbances, particularly peptic ulcer, intermittent diarrhea, and constipation).

In order to associate the types of people in this State with their environment, one must realize that it is divided geographically into three parts. East Tennessee is in general a mountainous region, although there is a fertile valley between the Appalachian Mountains and the Cumberland Plateau. Middle Tennessee contains the fertile Central Basin with a few counties in the western section of the Cumberland Plateau. West Tennessee is a part of the Coastal Plain. There are 4 cities with a population over 100,000 and 8 with a population varying from 10,000 to 30,000. The State is divided into 95 counties. According to the 1940 census, there were less than 30 persons per square mile in 16 counties and only 30 to 50 persons per square mile in 41 counties. The estimated population for July 1, 1943, was 3,014,869.[1] The urban population was estimated to be 28.2 per cent of the total population of the State, and 591,718 or 64.7 per cent were whites; 87.9 per cent of the rural population or 1,903,809 were white. The total white population was estimated at 2,495,527. The 1940 census showed that 56.3 per cent of the colored population of the State was in West Tennessee, while in East Tennessee, a very small proportion of the total population was colored. According to Davenport and Love,[2] in 1921, 0.6 per cent of the mountain whites were of foreign birth and 1.1 per cent had foreign parentage.

This analysis of rejections was the result of the screening type of examination of 18,881 inductees of which 1,668 or 8.84 per cent were rejected because of neuropsychiatric conditions exclusive of mental deficiency (See Table I). Of the total number of rejections, 568 or 34.1 per cent were rejected because of neurological diseases or disorders (See Table II). The neurological rejections represented 3 per cent of the total number screened. The data in this analysis presents an over-all picture of the male population between the ages of 18 and 37 in the State of Tennessee, but does not necessarily portray the situation that exists in any one county as compared to another. There was a great variation in the rejection rate between the various counties which undoubtedly was

TABLE I

DIAGNOSES IN PSYCHIATRIC REJECTIONS

Emotional Immaturity	356	Neurosis, Toxic	6
Psychoneurosis	290	Dementia	2
CPS Inadequate Personality	254	Drug Addiction	2
CPS Emotional Instability	155	Manic Depressive Psychosis	1
Somnambulism	14	Homosexual	1
Stammering	8		
Hysteria	6		
Post Psychothic	5	TOTAL	1,100

TABLE II

DIAGNOSES IN NEUROLOGICAL REJECTIONS

Enuresis	103	Cauda Equine Compression	2
Epilepsy	74	Cerebral Injury	2
Headache, Traumatic	49	Oculomotor Palsy	2
Migraine	40	Pellagra	2
Nystagmus	38	Radiculo-myelitis	2
Neuritis	35	Herpes Zoster	2
Neurofibromatosis	33	Subdural Hematoma	2
Poliomyelitis	25	Fracture, Skull	2
Bell's Palsy	16	Deafness (nerve)	2
C. N. S. Lues	15	Chorea, Huntington's	1
Sciatica	12	Acromegaly	1
Post-concussion Syndrome	9	Spastic Paraplegia	1
Birth Injury	8	Brachial Palsy	1
Nucleus Pulposus	7	Little's Disease	1
Dwarfism	6	Chorio-athetosis	1
Syncope	6	Spina Bifida	1
Torticolis	5	Neuralgia	1
Multiple Sclerosis	5	Degenerative Disease of C. N. S.	1
Cerebral neoplasm	5	Musculospiral palsy	1
Blepharospasm	4	Muscular Dystrophy	1
Tabes Dorsalis	4	Angioneurotic Edema	1
Encephalitis, Chronic	4	Meningocele	1
Diplopia	4	Brain Abscess	1
Labyrinthitis	3	Scalenus Anticus Syndrome	1
Hemiplegia	3	Chronic Arachnoiditis (Post-operative)	1
Encephalopathy, Hypertensive	3	Ophthalmoplegia	1
Tic	3	Polycythemia Vera	1
Hyperthyroidism, Toxic	3	Cerebral Agenesis	1
Progressive Muscular Atrophy	2	Orthostatic Hypotension	1
Raynaud's Disease	2		
Hypopituitary Syndrome	2		
Radiculitis	2	TOTAL	568

the result of environment, economic status, and the availability of medical care. This was especially true when the counties in the eastern part of the State were compared to those in the western part or the registrants from the mountainous counties compared to those from the large cities or the fertile farming areas in the western counties. During the period of time that these examinations were made, they were limited to the white registrants who reported from every county in the State.

In the psychiatric group of rejections, the largest number were classified with the diagnosis of Emotional Immaturity. This group included individuals whose ages ranged from 18 to 20 years but whose emotional reactions and, in nearly every instance, whose physical development corresponded to those of an average individual 6 to 8 years their junior. A large proportion of these individuals came from the mountain districts, and had received little, if any, education. In many instances they had never been over 20 miles from their own home and had associated very little with anyone outside of their own relatives. From a psychological viewpoint, they could not be considered mentally deficient. They had mental capacity and the functioning of these processes at their level of experience compared well with those of a child who had been subjected to a broader type of contact with society and at least an exposure to educational training either in the home or at school. While they were unable to discuss or reason logically about current events or

anything outside of their limited existence because of their inability to visualize the circumstances, their knowledge of nature study and their ability to use this knowledge was remarkable. It was recognized by the examiner early in the study of the "hill people" as a whole that there was a poverty of such expressions as are considered to be criteria of a reaction system. Those expressions which depend upon volitional neuromuscular mechanisms, such as facial expressions, pattern of bodily movement, verbal responses, and to some extent laughing and crying, which are to be expected in the average individual since they are of an acquired nature, were reduced to a minimum or absent. A similar lack of these expressions is present in the North American Indian. The more common visceral reactions which are effected through smooth muscle and the autonomic nervous system such as sweating, blushing, disturbances in respiration or blood pressure were seldom noted.

Investigation into the past histories of these individuals as a result of personal discussion with the inductee or information obtained from outside sources revealed the sluggish type of demonstrable "feeling" such as tension-relaxation, excitement-depression, and pleasantness-unpleasantness. These qualities were also found to be of a low intensity, slowly initiated but often retained for long periods of time. The best example of the duration of such a quality is the dislike or hatred retained in the well-known feuds in these localities.

It is not the intention of the writer to enter into any controversial field in regard to the fundamental mechanisms or interpretations of the expressions of emotions and feelings in the discussion of the behavior pattern in this problem. However, these observations would appear to conform with the opinion of Landis,[3] that, "It is safer to say that the major expressions of emotion are survivals of earlier biological and physiological functional relationships within the species, and that for the most part the shadings of expressions shown by the adult are the result of learning or training".

It was necessary to consider this stereotyped behavior in an attempt to evaluate the variations in emotional response in the physically undeveloped members of these people. In the emotional sphere there existed peculiar reactive conditions which were so pronounced and deviated from the generalized pattern as previously described for these people in general, that it was quite evident that they had not profited by learning and experience corresponding to their age. In most instances, the reactions were child-like and were more in keeping with their physical development. The unpredictable behavior appeared not to be due to constitutional lack of emotional control but rather to the type of stimulus that initiated the reaction and the inability to rationalize or properly evaluate the significance of the circumstances.

While many of the men from the hill country would be unable to tell the examiner what countries were at war, or the reasons for this war, he would quickly state that, "If there is a fight and I am needed, I am ready to go". From the past experiences in World War I and in the present war, there is no question but what they have made good fighting men. When these immature types were asked questions about war in the simplest of terms or situations involving combat were described to them, they became confused and it was with difficulty that proper contact could be maintained. There was no evidence of curiosity, anxiety or fear. During the discussion with any one individual, it was evident that his thoughts were focused upon something or somebody associated with his home environment. At other times he appeared to be in a daze without any demonstrable change in his emotional state. When the conversation was changed to a discussion of his home surroundings, he became a different person and would enter into the conversation in a normal fashion.

The above discussion of this problem is presented to justify the opinion that the emotional status of these individuals is immature and of such a type that it would impair their fitness for duty. This finding alone presents the possibility of a development of a personality disorder of a more serious nature as well as the inability to perform his duties in an entirely different social environment and a type of world with which he is thoroughly unacquainted.

With the diagnosis of Emotional Imma-

turity, this "little man" with a child-like emotional reaction was returned to his home for an opportunity of further development, both physically and mentally. The recommendation was made to his draft board to have him returned to the Induction Board in six months for another examination. This procedure prevented any form of a psychiatric diagnosis being established which might reflect upon his future career and which, in my opinion, would not have been justified. From the history of development of similar syndromes among these people in the past, there was no doubt in my mind that time, in his own environment, was the proper form of therapy to develop a type of individual who would compare well with the physical fitness and the mental pattern of the people of his community. To further justify the rejection of this type, the writer had an opportunity later at another activity to observe the effect of active duty upon similar subjects who had been accepted because they were borderline cases. They were unable to adjust to Naval life and in some instances were separated from the Naval service as Simple Adult Maladjustment, while in other instances they developed acute depressions, requiring prolonged periods of hospitalization.

One was greatly impressed with the honesty and sincerity of the "hill-folks" in their neuropsychiatric interview. There was no attempt to exaggerate symptoms and, in fact, more often they minimized their complaints and made little of disabilities that were obvious to the examiner. Malingering was practically unheard of. The incidence of psychoneurosis was extremely rare among these people and the rejections noted in this analysis came from the more densely populated areas of the State and the cities. These people had received a certain amount of education varying from grade school to college. Many had received training in trades or professions. The most bizarre neurotic syndromes and psychosomatic disorders were found in those recruits who had received an excellent education or were well established in a trade or profession.

In the differentiation of the Psychopathic Personality Types, those who were classified as Constitutional Psychopathic State, Emotional Instability, also came from the same areas as those who had pronounced Psychoneurotic States. Considering the type of personality of the "hill-folks," previously described, this finding was to be expected. Those classified as Constitutional Psychopathic State, Inadequate Personality were found in the recruits from all parts of the State.

To establish the diagnosis of C.P.S. Inadequate Personality in the people from the mountainous areas, it was necessary to understand their unique philosophy of life. To accomplish this, one must take into consideration their honesty and frankness, their belief in the Bible, their interpretation of the Federal and State laws, their code of morals, their degree of satisfaction as to accomplishments, happiness and mode of living, as well as their justification of acts which in other parts of the country would be considered antisocial. Their honesty and truthfulness were confirmed by comparing their statements with the reports submitted by social service agencies. Upon visiting their homes and its surrounding locality, one found a simple people living in a simple environment. They appeared reconciled to this type of life and satisfied to be alone and to be left alone. They had no secret ambitions to have their children attain heights of great responsibility and the children were contented with their lot. Since opportunities for diversity of amusement of a passive type were not possible, they obtained their pleasure and happiness in a primitive fashion such as hunting and fishing.

Their belief in the Divine Being was well established and they constantly referred to the fact that they were "God fearing people". Although many of them were unable to read, they would refer to quotations from the Bible to justify certain acts. When they were asked how they reconciled "Justifiable Homicide" with the commandment, "Thou shall not kill," they explained that the laws of the State gave them the right to kill under those circumstances. They insisted that they served a prison term for "getting caught" rather than for making liquor. In their opinion they were making liquor from ingredients which were produced from the soil of their own ground and it was made on their own premises, and since no "outsider" was disturbed

in this pleasure making act, they considered it was well within their rights, regardless of the Federal laws. At the same time they had the greatest of respect for State laws protecting game, rules of the road, protection of their property, etc., because "it made sense". These few illustrations are presented in an attempt to establish a basis for their mental processes as to right and wrong, and to avoid a snap judgment of criminal or inadequate personality.

Although the same criteria were used in the diagnosis of C.P.S. Inadequate Personality with this group of recruits as with those from other parts of the State, it is quite obvious that in order to properly evaluate the information obtained to determine the quality of the integrated individual, a quite different standard must be used as a basis.

In a special report on institutional population compiled by the Bureau of Census, U. S. Department of Commerce,[4] the white male population over 14 years of age in the State of Tennessee in 1940 was 860,330, and 2,883 or .34 per cent were in mental institutions, as compared to .553 per cent for the country as a whole. In considering an explanation for this low comparative figure for the State of Tennessee, one must weigh certain factors which are obvious, such as the small number of institutions for the mentally ill patients, the inability to recognize mental illness by other members of the family, the indifferent attitude maintained by the relatives or a desire to keep the patient in the home, the hesitancy of many families to seek medical care, and the uneven distribution and dearth of physicians, especially those interested in mental disease. If the above factors were responsible for keeping psychotic patients out of the institutions, then they would be in the home and subject to the laws of the Selective Service Act. Consequently they would have appeared at the Induction Center for examination at the time these examinations were made, as very little screening was carried out at the draft boards. There were only three frank psychotics, two dementia praecox, and one manic depressive psychosis who were returned to their draft boards under military escort.

According to the Bureau of Census in 1940,[4] there were 1,497,856 persons 25 years of age or over in Tennessee of which 62,453 or 4.17 per cent had no school years completed and 21.7 per cent had completed less than 5 years of school. The rejection rate because of educational deficiency per 1,000 white registrants examined at Local Boards and Induction Stations in Tennessee from April, 1942, to March, 1943, was 74.4 which was the highest rate of any State in the Union. Furthermore, the per cent distribution of principal causes for rejection at the Induction Stations in Tennessee during this same period of time revealed 19.2 per cent for white registrants compared to 6.8 per cent for the country as a whole.

After considering the personality traits of the isolated groups which do not predispose the individual to psychotic states, as well as the educational deficiencies and low percentage of urban population, it is the opinion of the writer that it is reasonable to believe that the incidence of psychosis in Tennessee is low as compared to the country as a whole.

The five cases of hysteria were typical combined motor and sensory disturbances of long-standing and none was found in the people from the hill country. Furthermore, hysterical twilight states, fugues, stupors, fits and excitement were unheard of in these people, as one would expect considering their personality pattern.

After obtaining a working knowledge of the social life, habits, beliefs and customs necessary to properly evaluate the psychiatric problems presented by the people in this State, interest in the neurological syndromes as a result of organic pathology was stimulated by the variety and frequency of such cases. In the classification of those cases rejected because of a neurological diagnosis, there is a miscellaneous group which, as a rule, would be included under those rejected by the Department of Internal Medicine. They were classified in the neurological group because the disabling factors of their disease or disorder were due to physiological disturbances of the central nervous system. The polyneuritis in the cases of pellagra; vertigo in orthostatic hypotension; headache, vertigo and syncope in polycythemia vera, and the cerebral complications as a result of skull fracture are examples of this group. The endocrine disturbances and the encephalopathy

as a result of the malignant phase of essential hypertension may be subjected to the same criticism although less debatable. As the result of a study of the neurological conditions found in the people in this State it was apparent that the frequency of certain types and the absence of others were worthy of further investigations for a possible explanation.

A statistical study of the white registrants between the ages of 18 and 44 published by the Selective Service System[5] covering the period between April, 1942 and March, 1943, revealed that Tennessee was the 19th State in the Union, with 31.9 per cent having no defects. The average for the continental United States was 36.8 per cent but there were 21 States ranging between 40 and 59 per cent, and the general average was lowered by such percentages as found in Vermont, 1.3 per cent; Massachusetts, 3.8 per cent; New Hampshire, 6.1 per cent; and Maine, 6.5 per cent. Although many of these defects were not disabling and the individual was accepted for the Service, it was recognized that in many instances these defects were the results of his own negligence.

The people living in the more thickly populated areas and in the cities were found to have sought medical care with moderate intent. In the rural districts and the hill country they depended more upon home remedies. In general this was influenced by inconvenience, poor facilities of transportation, economic status and unavailability of medical care. Among the hill-folks there was another factor which was difficult to understand. There appeared to be a sense of fear associated with the word "doctor". They admitted that they would only go to a doctor if it were absolutely necessary. When we considered their meager knowledge of symptoms and signs of disease and their inability to accept or even to suspect the seriousness of the results added to a suspicion and dread of a physician, it was easier to understand why so many cripples as well as acute medical and surgical emergencies appeared in the induction line. There were five instances of brain tumor with signs and symptoms of increased intracranial pressure and localization, and two cases of chronic subdural hematoma. Of the seven cases of nucleus pulposus with the characteristic history and neurological findings, only two of these cases had been previously examined by a physician and operated upon with a recurrence of their symptomatic picture. There were many cases which needed hospital observation and study to determine the cause for the clinical syndrome presented. In this group were the cases of severe neuritis, sciatica, syncope and labyrinthitis as examples. In such cases cited above, the nature of the illness and the necessity for medical attention as soon as possible were explained to the individual.

With the lack of medical care and diagnostic procedures, the infrequency of certain diseases, systemic disorders and their sequela is still more astonishing and less understood. In the virus group resulting in disabling sequela, there were 25 cases of poliomyelitis and 4 cases of chronic encephalitis, with the Parkinson syndrome moderately advanced.

In the per cent distribution of principal causes for rejection at the local boards and induction stations from April, 1942 to March, 1943,[5] the residuals of poliomyelitis were 25.7 per cent of those registrants rejected because of neurological diseases or disorders in all the States compared to 4.4 per cent in the present series in Tennessee, and sequela of encephalitis was 4.3 per cent throughout the country compared to 0.7 per cent in this State. Without entering into the debatable aspects of the transmission of virus diseases, it appears reasonable to draw certain conclusions when the State and its population are considered. Since there are large areas in this State where the population remain in isolated sections, there is very little personal contact with people in neighborhood communities and practically none with the densely populated areas. A large proportion of these people depend upon what they raise for food and the type of staple goods that are purchased could hardly be considered as possible carriers of disease. Although the possibility of self-immunization by exposure, mild or abortive attacks is reduced to a minimum in such localities, as observed by the incidence of contagious diseases such as measles and mumps in the service, it is believed that the more serious and devastating diseases such as poliomyelitis and encephalitis are avoided. This belief is further sub-

stantiated by a study of the vital statistics[1] for the State of Tennessee, which revealed 27 deaths due to poliomyelitis and 20 due to acute infectious encephalitis in 1942, while in 1943 there were 6 deaths due to poliomyelitis and 12 due to acute infectious encephalitis. Of the 33 deaths due to poliomyelitis, 5 were residents of Eastern Tennessee, in which there were no cities. Of the 32 deaths due to acute infectious encephalitis, only 3 were residents of Eastern Tennessee. The highest death rate per 100,000 due to poliomyelitis was 1.6 in 1936, and for acute infectious encephalitis it was 1.1 in 1934.

In the group of neurological syndromes due to vitamin deficiency, only two cases of pellagra were rejected. In the year 1943, 92 deaths or a death rate of 3.1 per 100,000 due to pellagra were recorded[1] in the State of Tennessee, but there was only one death of a white male under 44 years of age. There has been a gradual decline in the death rate since 1927 and the death rate of 3.1 in 1943 was a new low record. There was one case of spastic paraplegia and one of degenerative disease of the central nervous system which was believed to be sub-acute combined sclerosis although not proven. Ten of the 25 cases of neuritis were generalized and undoubtedly vitamin deficiency was responsible for the pathology, but alcohol was believed to be the etiological factor. These findings would appear to prove that the diet, varied as it was found to be in the various localities, was adequate as to its vitamin content. Three cases of hyperthyroidism of the exophthalmic type which were moderately advanced, were rejected, but no instances of colloid goiter or localized adenomata of the thyroid were found. The physical examination of the first million draft recruits of World War I[6] revealed that exophthalmic goiter in Tennessee occurred 0.07 per 1,000 of the men examined and that this was the second lowest rate in the Nation, as there were no cases in the State of Delaware. Three cases of pituitary dysfunction were the only other endocrine disturbance noted. In the Medical Statistics Bulletin No. 1, 1941,[7] the endocrine disturbances were 1.2 per cent of the total number of defects noted for the country as a whole.

Only those cases of chronic alcoholism where it appeared as a part of an inadequate personality syndrome were rejected. Two instances of drug addiction were admitted by the recruits and confirmed by outside sources. One individual presented the objective evidence of homosexuality, which he admitted.

Syphilis, as diagnosed serologically or identified by stigmata of congenital lues, was rare among the hill-folks. Since these people are so hesitant in seeking medical attention for illnesses which are even disabling, and their inability to recognize the primary lesions of syphilis, it would be reasonable to suppose that if this disease were at all frequent, the stigmata of congenital syphilis and positive serology would have been found. In fact, not a single case of congenital syphilis was found in this group. In contrast to people in these localities, the rate was very high in the large cities. Considering the large number of people who were serologically positive, there were only 4 cases of tabes dorsalis and 15 cases of cerebrospinal syphilis.

The per cent distribution of principal causes for rejection at local boards and induction stations from April, 1942 to March, 1943 because of syphilis was 6.3 in Tennessee compared to 4.0 for all States.[5] The rejection rate because of syphilis per 1,000 white registrants examined at Local Boards and Induction Stations during the same period of time was 24.2 which placed this State as the 38th in its height of rejections for this cause.

In the per cent distribution of principal causes for rejection, neurosyphilis was 3.5 per cent in the present group analyzed, compared to 6.3 per cent for the white registrants throughout the country from April, 1942 to March, 1943. This is one more example of the inconsistent findings in different countries or parts of the same country as to the incidence of neurosyphilis in proportion to the frequency of the disease.

The frequency of neurofibromatosis, or von Recklinghausen's disease, was the most striking of all of the neurological diseases. The 33 cases recognized were from the mountainous counties in the eastern part of the State and although several of these individuals were from the same county, they were not related as far as could be determined. Although this disease is considered to be hereditary and behaving in inheritance as a

Mendelian dominant,[8] there were only three instances where the person examined was able to recall one other member of his family having a similar condition. As none of these men was aware of the significance of these small tumors, any attempt to establish a reliable familial history was impossible. The three in which it was quite clearly proven, stated that they had a brother who had "lumps" all over his body which was similar to their own and were tender on pressure.

All cases of neurofibromatosis were of the peripheral type with one exception which was the pedunculated mollusca fibrosa. No cranial nerve involvement or complications were found. They varied in number from twenty to over a hundred, distributed over the extremities and trunk but more numerous over the anterior surface of the thighs and the back, and were tender upon pressure. In 28 cases the café-au-lait type of cutaneous pigmentation was present. A careful search was made in each case for other congenital anomalies, but the only one found was hemangiectatic naevi in one case. Although polydactylism and syndactylism, cleft foot and harelip were other examples of dominant inheritance frequently observed in the hill-folks, they were never associated with neurofibromatosis. The less understood hereditary abnormalities such as defective formation of the lower extremities and deformities of the ears were common. In the statistical report of physical defects in World War I,[6] it is noted that congenital defects of the feet were 7.83 per 1,000 men examined from the State of Tennessee. There were six unrelated achondrodysplastic dwarfs.

There were 38 cases of congenital nystagmus and 32 of these were familial, but in no case was there hereditary history. Numerous etiological factors such as birth injury, amblyopia, imbalance of the extra ocular muscles, albinism, etc., have been recognized in the isolated instances of congenital nystagmus, but there is very little known about familial nystagmus. Nystagmus has been described as fragments of syndromes which are considered familial or hereditary, examples of which are nystagmus-myoclonia of LeNoble and Aubineau and aplasia axialis of Pelizaeus-Merzbacher as quoted by Wilson.[9] In the familial types observed in this group there were no other abnormal physical or neurological findings noted. In two families previously examined by the author, there were 6 and 4 children, and 2 brothers in each family had congenital nystagmus, but were free of other abnormal findings. In each family there was one albino, with no other affection. There were numerous instances of albinism, total and partial, among the hill-folks, but none in the group presenting nystagmus. Unfortunately, lack of time prevented a more complete study of this interesting familial disorder.

The frequency of enuresis in servicemen from Tennessee has been recognized by Medical Officers in the Naval Service during this war, because of the numerous admissions to the sick list with this complaint. After observation in the sick quarters or hospital, the diagnosis was confirmed in a large proportion of cases. Realizing that this complaint can be offered as a form of malingering which is difficult to disprove without hospitalization, it became a difficult problem because it was so frequently presented. It was noticeable early in the examination that this complaint was presented early in the interview, apparently as a reason for rejection in a few instances, but was obtained with difficulty in most cases from the hill country and seldom ever offered unless asked for. When the condition was admitted, it was referred to as "kidney trouble". Further questioning revealed the reason for this interpretation. When a child continued to wet the bed after the age of 2 or 3 years, he was considered to have kidney trouble. The home remedy among the hill people for this condition is turpentine, which is given as a regular routine. The turpentine acting as a diuretic increases the urinary output and defeats the purpose for which it is given. Many of these people offering this complaint had continued to take turpentine from childhood up to the time of the examination, and in certain cases, over a period of 20 years or more. The lethal dose is not known, but in one adult, 6 ounces caused death, and in children, 1 dram to 4 ounces may be fatal. A large dose causes irritation of the kidney, kidney pelvis and bladder.[10] In these cases I was unable to obtain the history of hematuria or albuminuria at any time and the urine examinations at the

induction center were within normal limits. Although the home remedy had failed to check the "kidney trouble," no attempt had been made to seek the advice of a physician. Many of these cases were confirmed by social service investigation and were rejected. In the other cases, where enuresis was claimed, the problem was solved purely on the basis of the examiner's judgment from the history obtained and the type of individual examined.

The diagnosis of epilepsy was made in those cases where a definite history of repeated attacks of convulsive seizures was obtained from the patient and in the largest percentage of the cases, the diagnosis was confirmed by social service records. The unfortunate observation obtained from the discussions with these individuals was the general opinion that their affliction was incurable. Many of these people had never sought medical service. Others had been told that there was no cure for the disorder, and only four admitted that they were following a regular routine of medication. These people were apparently reconciled to their future and did not appear apprehensive or depressed. In this series of cases epilepsy represented 13 per cent of those rejected because of neurological diseases or disorders, as compared to 20.1 per cent for all States from April, 1942 through March, 1943.[5]

Headache is a frequent complaint offered by recruits at induction centers and this station was no exception. There were 40 recruits rejected with the diagnosis of migraine because of the history of severe recurrent headaches with nausea, vertigo and scotomata. In nearly every case, there was a history of "sick headaches" and in many instances the history was confirmed by reports from the social service agency. Compared to the migraine syndrome there were 49 rejected because of severe headaches claimed to be traumatic in origin. These claims were substantiated by either social service confirmation or objective evidence of head injury. The frequency of head injuries with and without sequela was remarkable and could be divided into two classes according to origin. One group was the result of injury incurred in industrial occupation, especially in the mines or factories. The other group was most frequently found in the hill-folks and was due, in many cases, to accidents as the result of awkwardness, carelessness, lack of concentration or poor judgment. In this latter group of individuals the frequency of bodily injuries was also startling, especially the amputation of toes and lacerations of the feet with an axe.

COMMENT

Attention is called to the unusual type of personality found in people coming from certain districts in the State of Tennessee and the problem they presented in differentiating functional neuropsychiatric disorders. The observation and study of these people have emphasized the importance of "knowing the patient" before forming an opinion. Before an evaluation of any neuropsychiatric problem should be attempted, the examiner should be in a position to visualize the average normal pattern of behavior expected of the individual as well as his reactions to his environment and society in general. If the examiner is unacquainted with the peculiar philosophy of life and the psychological reactions of any isolated group, errors of judgment are sure to be the result of comparisons with criteria adopted for the country as a whole. If the recognized criteria were followed for this isolated group, stigmata may have resulted in certain cases which were not justified and in other instances, men would have been accepted who would have been unable to adjust to military service and who may have developed serious functional nervous disorders or psychosis. The adoption of the impression of emotional immaturity, with the recommendation that the recruit be re-examined at a later date, afforded an opportunity for this person to realize that he was not rejected because of an illness, but that he was undeveloped and that time would produce the change whereby he could compete with his fellow men.

The infrequency of psychoneurosis and the neurotic traits and psychosomatic disorders in the isolated groups of the hill country compared with the functional nervous disorders in the more densely populated areas is one more example of the direct relationship between these disorders and education, culture, and society. The same relationship was present in the distribution of the C.P.S.

Emotional Instability, but the latter types were found in all parts of the State, although it was necessary to use a different standard for the proper classification of the two personality patterns presented.

The frequency of an hereditary disease, neurofibromatosis, and a familial disorder, congenital nystagmus, was pronounced. Other hereditary abnormalities were common among the isolated groups. This State presents a fertile field for the study of genetics by the experimental biologist, as well as the study of personality patterns by the psychologist.

The few instances of the sequela of the virus diseases such as poliomyelitis and encephalitis, and degenerative disease of the central nervous system as the result of vitamin deficiency or system disease were remarkable. The infrequency of the diagnosis of syphilis, either serologically or from evidence of congenital stigmata in the isolated groups in the hill country was worthy of note.

This study of the recruits from the various sections of the State illustrated the influence of the educational system upon the attitude of the inhabitants toward medical care. When a draft of men arrived from the farming areas in the western part of the State, one was impressed with the fact that a large number had graduated from grade school and had at least some instruction in high school. The finest physical specimens came from this part of the State. The respect for the physician and the desire for medical care and good health were clearly demonstrated throughout this group. The recruits from the hill country illustrated the distrust and fear of the physician as well as the careless and indifferent attention paid to the most obvious symptoms, with a lack of anxiety as to the results. The absence of surgical care in many cases or the late appeal in others was responsible for numerous crippled conditions presented.

These observations emphasize the necessity for an educational program to be carried out by the health authorities in this State in an attempt to convince the skeptical of:

1. The importance of early diagnosis and treatment of disease.
2. The dangers involved in home remedies.
3. The fundamental principles of good hygiene, which can be carried out by simple procedures.
4. The important role that a physician can play in the every-day life of a family.

These suggestions are offered with the full realization that the problems of such a program are many and must be carefully planned to prevent antagonism. Any attempt to change the philosophy of life or customs of these people in general would defeat the purpose in mind and undoubtedly increase the barrier between them and their better-informed neighbors. Considering the high degree of illiteracy, methods of presenting such a program must be by means of lectures and audio-visual aids rather than printed literature. As a result of the special training of hospital corpsmen, in both the male and female personnel of the military services during the war, it is a suggestion that from such a source, a nucleus for this program could be formed after they have been separated from the service.

The uneven distribution of physicians throughout the State is well known to state and county medical societies and since this is true in so many states in this country, no comment is offered. The program suggested for the State of Tennessee would also apply to many other states which have similar isolated groups.

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Neurotic Behavior Patterns Arising Out of the Combat Situation

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There has been much controversy and diversity of opinion concerning the nature of "War Neuroses" and the etiological factors explaining neurotic behavior among the Armed Forces. It is possible to draw a distinction between the usual psychoneuroses, occurring among civilians in peacetime, and "War Neuroses" occurring in the Armed Forces, in the combat situation.

Differentiation between individuals predisposed to instability and breakdown and individuals whose past history shows an absence of prior neurotic personality disorders and normal adjustive behavior must be made. Sargant and Slater[1] stated that acute cases of "War Neuroses" demonstrate that men of reasonably sound personality may breakdown if the strain is of sufficient severity; that these cases had shown a satisfactory adjustment to the demands of army life; and that case histories presented the picture of normal intelligence, personality, and work. They further state that, "The stress required to produce a breakdown of such personalities was of an altogether different order from any to which they could expect to be subjected in ordinary life".

"War Neuroses" are not neuroses, as strictly interpretated, but neurotic behavior patterns. "War Neuroses" do not constitute a psychological domain described by invariable syndromes. Personality organization is, by nature, extremely complex and disintegration of this personality at different levels varies over wide limits, thus producing a corresponding variation of symptoms which make their appearance and are dispersed rapidly as the personality inadequately deals with the situation. This rapid fluctuation of symptoms is replaced by an "organized" behavior pattern. Descriptions of these behavior patterns through classification systems do not sufficiently provide for individual variation or of description of typical clinical pictures. Such behavior patterns arising out of the combat situation are termed neurotic behavior patterns and they are psychological. These reactions must be considered from the quantitative rather than qualitative point of view and further, these reactions are functionally related to the environment.

In describing the syndrome of neurotic behavior patterns the following symptoms are presented:

An overwhelming sense of guilt arising out of the behavior of the individual in the precipitating situation. These feelings of guilt may or may not be accompanied by emotional depression.

One of the most diagnostic symptoms is the terrifying nightmares, in which the individual may or may not relive the precipitating experience. The central theme of these nightmares is the event, but fear and anxiety express other terrifying dream situations, visual and auditory sensations being vividly recalled. A state of anxiety concerning the nightmares may exist and in such states, withdrawal, irritability, and moroseness on the part of the patient is frequently found.

A third diagnostic symptom may be found in an exaggerated response to sudden sounds which may be described as a startle reaction, for the tendency seems to be to associate such sounds with the precipitating event. An emotional state may be associated with this "reflex". When such emotional reactions do exist, increased sweating, flushing or blanching of the skin, coldness of the hands and feet, dryness of the mouth, and increased palpitation is characteristic of these facts. In some cases immediate localization of the nature of the sound may serve to limit the range of this reaction. Cases have been reported in which such a noise precipitated behavior of a hysterical type with accompanying weeping and other vocalization.

Hyperkinetic states represent another syndrome. Tremors, ranging from fine to coarse are of diagnostic value.

A most complex situation is found in patients suffering from gastric symptoms associated both with anxiety and depression. This association varys within wide limits,

cases being reported in which patients did not experience anxiety at the conscious level.

As diagnostic criteria varies with Medical Officers depending on their psychiatric background, the following five necessary conditions are pointed out:

Absence of prior neurotic personality disorder must be established. Inquiry into the past history of the parental environment must be made to ascertain the existence of instability on the part of one or both parents, and the acquired nervous instability on the part of the patient in such an unstable environment, for the literature is filled with cases showing anxiety on the part of the individual as he "recognizes" in himself, symptoms similar to those exhibited by psychotic parents. Adjustive behavior of the individual must be analyzed. What was the child-parent relation? What was the relation between the patient and other children in the family group? How did the patient approach the school situation? In such person-to-person adjustments did the patient develop such symptoms of emotional maladjustment as bed-wetting or stammering? When did hetero-sexual adjustments occur and are such adjustment normal? These questions serve as leads to adjustive behavior on the part of the patient.

A precipitating experience or event must exist. Operational fatigue and combat stress are not in themselves, sufficiently intense as to precipitate such neurotic reactions, for as such, they are not personalized. The point to be made is that the experience or event must be in terms of the individual. The event as such is not all important, as is the reaction of the individual to the event. The individual's reaction to the event may be expressed by R in the equation R equals (H E T), where H is the hereditary characteristics, E the environment, and T the time element, these dimensions being functionally related to R. Individual differences in regard to these R's for individuals, may be thus explained in that different values in the variables are implied. It is thus one pilot may see his wingman in a head-on collision and go down in flames and be little affected, whereas another pilot may experience a disproportionate emotional stress in the identical situation.

In the recall of operational missions or combat experience, the individual exhibits tremendous emotional reaction. These reactions may be characterized by increased sweating, blanching or flushing of the skin, coldness of the hands or feet, dryness of the mouth, tremor, and palpitation. Speech patterns may be altered and reflexes exaggerated.

Prognosis concerning these neurotic reactions is good, with patients showing immediate response to appropriate therapy and continued improvement. When the patient is free from emotional depression, terrifying nightmares and acute anxiety concerning the combat situation, and no longer reacts violently to loud noises, he may be released for further combat. When a patient can recall his combat experiences or operational missions without emotional reaction, he may be considered recovered. A further check may utilize the combat films taken on missions in which the patient participated or in which the precipitating event occurred.

Beyond these examples of neurotic behavior pattern, lies the domain of the true psychoneurotic. In conversion hysteria, neurasthenia, compulsions, obsessions, and organized anxiety states, we have examples of such behavior patterns. The therapy to be followed here would not differ from that followed in cases occurring during the peacetime setting.

Therapy for patients suffering from neurotic behavior patterns, arising out of the combat situation, must begin at once. Evacuation from the immediate combat environment is effected as soon as possible. For the ground and Air Forces alike, this point is the General Hospital. Deep sleep, insulin subshock, and psychological desensitization, essential elements of this treatment are promptly initiated.

Incoming patients are brought in for a brief consultation with the medical officer in order that an evaluation of the stress operative in the patient may be made. A review of the combat experiences or precipitating event, superficially or in detail, as narcosis is begun, for the sodium amytol or sodium pentothal, acting on the hypothalmous, produces a hypnotic-like state in which the patient may verbalize his fears and the precipitating event without anxiety. Positive suggestions concerning the effectiveness of the treatment are introduced at this time.

The sleep, initiated by this initial injection, must be deep. Normal sleep as such is not of therapeutic value, for the mechanisms of conditioning is still operative. Deep sleep may be defined as sleep characterized by complete muscular inactivity. At this level, the patient's arm when raised, will fall when support is withdrawn, without muscular activity. This level of sleep is highly desirable, for all conditioning is broken down. Narcosis extends over three days, providing between 48 to 52 hours sleep. Special care must be taken in regard to feeding; the patient being allowed sufficient time to awake in order that he may feed himself with assistance of nursing staff. A full diet is very important throughout the patient's stay in the hospital. The necessity of carrying out narcosis over prolonged periods is seldom necessary. If this condition is encountered, a waking period of several hours is allowed. Throughout narcosis great stress must be placed on careful nursing. This is particularly true when the patient wakes after experiencing a nightmare. Reassurance by a nurse will greatly aid in providing the patient with security.

Insulin sub-shock treatment follows narcosis. Under this treatment the patient gains weight rapidly and experiences a loss of the secondary symptoms where these symptoms occur. Patients usually report that they "feel better than they have in a long time". Psychotherapy carried out during sub-shock should carry positive suggestions of improvement and stress on the fact that the body is modifiable, and that the patient will be better able to deal with the environment after the treatment.

Psychotherapy is continued after sub-shock treatment. At this stage the patient is seen to have recovered from his exhaustion, has gained weight, and good rapport between himself and the medical officer has been established. Every effort must be made to establish a sense of security for the patient. Opportunity for informal talks with the medical officer in which the patient may verbalize his fears should exist. If a review of the combat experiences was not made as narcosis was begun, a thorough review may be made at this time. An evaluation of the patient is made utilizing psychometric methods as may be applicable. Psychodynamics may be explained to the patient in an effort to assist him in evaluating himself. As the patient feels that he is evaluating himself and gaining insight into the nature of stresses and their relation to him, psychotherapy becomes more effective. A quantitative measure of this insight is helpful in assisting the medical officer make dispositions. Re-education of the patient cannot be overemphasized. The medical officer must make it possible for the patient to discover the purposes, fears, and stresses which were operative at the moment of the precipitating event, and what the event did in relation to these fears, desires, etc.

Abreaction or narco-synthesis, a term used by Grinker in reporting psychiatric experience in North Africa, deals with the re-experiencing of intense emotions which were originally associated with the traumatic battle experiences and which have been repressed. The objective of the treatment is to discover the nature of the traumatic incident and the repressed memories and to synthesize this material into consciousness.

The abreaction begins with the administration of sodium amytal or sodium pentothal, the choice of drug depending on the situation. With sodium amytal, administration is slower and the effect is more prolonged. Sodium pentothal is preferred when it is desired to project the patient into the traumatic situation. The dosage of either drug is usually between 0.25 and 0.5 gram. There is evidence supporting the view that the more severe the ego conflict, the less drug is required. Where patients have made a previous, partial adjustment, and are said to have free floating anxiety, the dose required is often larger than 1.0 gram. Grinker recommends an injection of 0.1 gram per minute. Pupillary reflexes and tonus of the eyelids serve as indicators of disorientation in mute or stuporous patients, where the usual counting backwards from the number 100 is not possible. As the administration continues, speech becomes thick and unless the disorientation is accurately judged, the patient is apt to pass over into sleep. It is therefore important to terminate the administration when disorientation is complete and speech intelligible. There are patients who will pass off into sleep in spite of good management in administration. Often this

type will abreact after awakening.

Any information concerning the combat situation from which the patient was evacuated, is of utmost value as it may be used as a wedge to loosen repressed material. Such information will also enable the patient to play the role of the characters in the situation at the time of the trauma.

During the abreaction the traumatic experience is apt to be relieved with a release of emotions. This experience must be synthesized into consciousness after the patient is no longer under the effect of the drug. It is then that psychotherapy aimed at the shifting of certain aspects of the patient's failure are best accepted.

If hypno-analysis is desired, sodium amytal is preferred, as the reactions are less intense and the effect of the drug can be prolonged for several hours. Resistance can be recognized by the analyst and overcome. Then the interview may be immediately resumed.

As far as preventive medicine is concerned in regard to these cases, security for the individual in the combat situation is most important. Inherent in combat security is morale and training. It has been the experience of the classification officers in the several psychological research centers that the implications of combat aviation were not understood. Air crews arriving in Theaters of Operation exhibit a lack of mental preparation for combat. The impact of combat upon such individuals whose combat attitudes have not been formulized, is devastating.

Instances where replacements have just arrived, and under pressure of operations, the individuals have been declared "operational," it has been the experience that these individuals have not had sufficient time to estimate the conduct of their fellow crew members under fire, and this adds to their own sense of personal danger. Under such circumstances insecurity and anxiety for the individual in regard to combat operations can be understood.

Adequacy of training on the part of the individual is very important. Highly trained men react to the combat situation automatically. Responses at an automatic level relieve much tension. The importance of training in providing for the individual in the combat situation cannot be overestimated.

SUMMARY

It is possible to draw a distinction between the usual psychoneuroses and the so called "War Neuroses". These "War Neuroses" are not neuroses in the strict sense of the word, but neurotic behavior patterns characterized by absence of prior neurotic personality disorder, the existence of a precipitating event, abnormal emotional reaction exhibited in the recall of combat experiences, and excellent prognosis. Differentiation was made between individuals predisposed to instability and those individuals of a reasonably sound personality.

In describing the syndromes of such behavior patterns, the overwhelming sense of guilt arising out of the behavior of the individual in the precipitating event, the nature of the terrifying nightmares, the startle reflex, tremors, and gastric symptoms were discussed.

Rest and emotional desensitization of the patient to such traumatic experience provide the most effective therapy. This therapy should begin at once, and rest may be induced through drugs. The value of careful nursing and full diet is emphasized. Psychotherapy should begin where narcosis is left off. The point to be made in the psychotherapy is that the patient must establish the attitudes and drives which were operative at the time of the precipitating event, and what the event did in relation to these attitudes, drives, and etc.

Preventive medicine from the standpoint of establishing for the individual security in combat, is all important. Crystalization of why the individual must fight and a thorough indoctrination of aggressive attitudes in regard to combat, is essential. New air crew members should be provided the opportunity to observe the operational efficiency of his fellow crew members. Training of the individual to the point of automatic responses is recommended as highly desirable.

Neurological Clinical Pathological Conference

of the

Cincinnati General Hospital

CHARLES D. ARING, M.D., *Editor*

Case No. 170491

PRESENTATION

A white laborer, aged 34, entered the hospital complaining of weakness of the right extremities and difficulty in speaking, developing over the course of a few minutes.

The patient had visited the Out-Patient Dispensary in 1935 because of weakness, productive cough, anorexia, and twenty pounds weight loss. Once he coughed up some blood. For an indefinite time he had noted severe frontal headaches, which were usually unilateral and sometimes were preceded by spots before the eyes and loss of sight. Examination at that time revealed only the evidence of chronic nasal and postnasal discharge. The otolaryngological service made a diagnosis of chronic ethmoiditis. A roentgen plate of the chest showed increased bronchial markings. He was seen next in 1940, again complaining of cough, postnasal drip, and frontal headaches for four weeks. Moderate amounts of tenacious, mucoid purulent discharge was noted and a diagnosis of bilateral ethmoiditis and bilateral maxillary sinusitis was made.

The patient was not seen again until his final admission on June 11, 1944, but stated that he had been in good health until two months previously when he had felt weak and lost weight. One month before admission he developed a sore throat, which was followed by progressive weakness and weight loss. He remained at home for four weeks because of weakness and frontal headaches, anorexia, cough productive of mucoid sputum, night sweats, and possibly fever. He lost twenty pounds. The headache was described as dull, continuous, and aching in nature. In addition, there was some low back pain, relieved by rest.

The patient appeared to be going downhill slowly when on the day before admission he suddenly developed weakness of the right extremities and difficulty in speaking, associated with numbness and coolness of the same parts. He did not fall nor lose consciousness. Speech difficulty consisted of inability to find words or to name objects. These symptoms gradually receded over the course of the day.

The patient was well-developed, poorly nourished, asthenic, and appeared chronically ill. He was oriented and cooperative. Speech was slightly indistinct. Fundi and optic discs were normal. The tympanic membrane of the right ear was thickened. The neck was supple. Cervical, axillary, epitrochlear, and inguinal nodes were shotty, but not notably enlarged. Heart and lungs were normal. The right face and extremities were slightly weak and the deep reflexes were less active on the right than on the left. The abdominal reflexes were absent on the right, active on the left, and there was a Babinski on the right.

Course: The patient ran an irregular spiking temperature, with daily peaks of 100 to 101 degrees F. Pulse persisted somewhat low relative to the temperature. On the third hospital day he began to have some vomiting. On the sixth day he had a 30 minute episode of aphasia and from that time his headache became much more severe and persistent, most marked in the left temporal region. On the eighth day reduction in awareness was obvious. He was given sulfadiazine without apparent effect. On the ninth day some stiffness of the neck and a suggestive Kernig's sign were noted. Otolaryngological consultation revealed no evidence of any active disease of the paranasal sinuses. After the tenth day temperature elevations reached 102-104 degrees F. At that time it was noted that lateral deviation of the left eye could not be carried out and there was marked photophobia. He seemed to have diplopia. The right-sided weakness, however, was less evident and the deep reflexes were equal. A ventriculogram was performed on the twelfth day. Following this, delirium became more obvious and two days later respirations became weaker and ceased unexpectedly.

Laboratory Data: The blood pressure was

110/70. The hemoglobin was 12 grams, the red blood count 4.32 million, the white blood count 5,450 to 8,800. The day after ventriculography the white blood count was 12,400. The polymorphonuclear leukocyte count was 66 per cent, lymphocytes 22 per cent, and monocytes 12 per cent. The urine was normal. Three examinations of the sputum and a gastric analysis were negative for tuberculosis. The stool was negative. The blood Kahn was negative. The blood urea nitrogen was 12 mg. per cent. Three blood cultures were negative. Agglutinations for typhoid and paratyphoid were negative. The electrocardiogram was interpreted as showing sinus bradycardia with a rate of 62, PR .19, and QRS 0.09.

The cerebrospinal fluid revealed the following findings.

Day	*Pressure*	*Appear.*	*WBC*	*Polys.*	*Protein*	*Sugar*	*Chloride*
1	190	Clear	29	0	29	55	712
7	280	Clear	22	0	62	31	671
11	460	Clear	400	0	165		

The cultures of the first two specimens were normal. A guinea pig was inoculated with the second specimen; the pig died six weeks later, negative for tuberculosis. The Wassermann was negative, and the gold curve normal.

Ventriculogram (12th day): Forty cc. of air were introduced into the right lateral ventricle. The lateral and third ventricles were dilated grade 2, and were in normal position. The aqueduct of Sylvius was not seen clearly. There were generous amounts of air in the region of the cisterna magna. There was no air in the basilar cisterns or over the convexities.

PA teleo-roentgenogram of the chest revealed calcifications in either hilum. Questionable infiltrate was seen in the right upper lung field. Roentgen studies of the skull, sinuses, and mastoids revealed no abnormality.

DIFFERENTIAL DIAGNOSIS

Dr. Milton Rosenbaum: The question arises whether in 1935 there was association between generalized systemic symptoms and the neurological symptoms of headache with loss of sight. It is hard to say whether the headache complained of then was part of a sinus condition. One wonders whether the severe frontal headache associated with visual symptoms might not have been a manifestation of migraine. The latter disease will be mentioned again.

A diagnosis of chronic ethmoiditis was made. As we look back to the record of 1935 we wonder just what respiratory disease was at work; did this patient have chronic sinusitis or did he have tuberculosis? The diagnosis of tuberculosis must have been suspected. Do the changes in the roentgen ray indicate chronic bronchitis or bronchiectasis?

Apparently in 1940 it was felt that his symptoms were those of sinus infection. Possibly I minimize sinusitis, but I wonder whether chronic sinusitis in itself is capable of initiating such weight loss and the rather severe clinical picture.

The sudden onset of hemiplegia means vascular disturbance. Certainly from the clinical picture there was no hemorrhage, recovery was too quick and complete. Neither does the usual type of cerebral thrombosis act in this manner. If a vessel was involved by thrombosis, it was small and didn't interfere too much with vital parts of the brain.

At this point, as far as the neurological diagnosis is concerned, one would think of a complication of sinus infection, by direct extension from the sinuses into the central nervous system, or an embolic spread from another focus, as the lung.

One would also have to suspect tuberculous infection of the brain. In meningeal tuberculosis there is a tendency for the small arteries to become involved in a thrombotic process.

Transient neurological disorder may result from functional disturbance of the cerebrovascular system, such as spasm of cerebral vessels, a possibility to be considered since the patient had previously suffered from migraine.

There is some diagnostic aid in the laboratory data. The white blood count was within normal limits, an important fact since brain abscess with infection in the sinuses

or lungs would be expected to elevate it. We are dealing with chronic infection and the hematological evidence favors the diagnosis of tuberculosis. Against the diagnosis of tuberculosis was the fact that the sputum was negative and other tests directed towards proving this disease were also negative.

Now to one of the most important aspects of this case, the cerebrospinal fluid. The patient was a young man who came into the hospital with chronic infection and focal neurological signs. In the first analysis of the cerebrospinal fluid the pressure was slightly increased (190 mm), and the only other abnormality therein was a lymphocyte count of 29 cells per cmm. So we may say that the cerebrospinal fluid is indicative of an aseptic type of meningeal reaction. I think it probable that brain abscess was the favored diagnosis during the early hospital course.

On the third day he began to vomit and on the sixth day he had a 30 minute episode of dysphasia. Evidently something happened again that had happened previously and a vascular disturbance is indicated. After the sixth day he began to go downhill; headaches became worse. On the seventh day we find a changed cerebrospinal fluid. The pressure was increased further and although the cellular content remained the same, the sugar and chloride had been definitely lowered. The important point is that the cerebrospinal fluid was changing toward the septic type.

We have to consider a change in our diagnosis. We are following the course taken by a patient who we thought had a brain abscess. If he had an abscess the sugar and chloride content of the cerebrospinal fluid should not be depressed in the face of unchanging cellular content. At this point in the case record I would have made the diagnosis of tuberculous meningitis.

On the eighth day he was started on sulfadiazine and the lack of response substantiates our diagnosis. On the ninth day he developed meningeal signs. Still tracking down an abscess the otolaryngologists were called in to recheck their previous opinion; suddenly the sinuses became normal after all those years of sinus abnormality!

The disease now progressed rapidly just as does tuberculous meningitis when the typical cerebrospinal fluid constellation is established. The sixth nerve palsy is not of localizing value; it may occur whenever intracranial pressure is increased. He had basilar meningitis and the latter may involve cranial nerves. There was increase in meningeal reaction. It is to be noted, however, that the white blood cells in the cerebrospinal fluid were all lymphocytes. If he had had abscess with rupture producing pleocytosis, polymorphonuclear leukocytes would be found.

Obviously it was felt this man had a brain abscess and therefore ventriculograms were made. These aid us to rule out brain abscess, since they reveal hydrocephalus only. Why should this man have dilated ventricles; he was not old and he had had no chronic type of brain disease. Probably they substantiate the diagnosis of tuberculous meningitis. The basilar cisterns weren't filled, possibly because of meningitis around the base, though ventriculography need not outline the convexities or basilar cisterns in the normal person.

A guinea pig died within six weeks of inoculation with cerebrospinal fluid without showing evidence of tuberculosis. That is a bit disconcerting. Possibly there were no bacilli in the cerebrospinal fluid which was that of the seventh day of the illness. Further evidence against brain abscess in this case is the fact that the focal signs did not progress; he suffered a hemiplegia which cleared up.

I think the diagnosis in this man is tuberculosis of the brain and meninges. We may probably find involvement of some small cortical vessels to account for the focal findings.

Dr. Robert Ritterhoff: The guinea pig lived six weeks after inoculation; it should have shown evidence of tuberculosis. Would you think of other things besides tuberculosis? How do you dismiss torula?

Dr. Rosenbaum: Obviously what I have said about the cerebrospinal fluid would hold also for torula. Now that you mention it, it might be considered a diagnostic possibility. But I have the feeling our patient's meningeal and nervous signs developed too quickly for torula meningitis. One would expect to see the yeast forms in the cerebrospinal fluid, though they are easily missed if they are not kept in mind.

DISCUSSION OF PATHOLOGY

Dr. I. Mark Scheinker: On gross examination of the brain the gyri appeared flattened and broad. The leptomeninges at the base showed thickening especially in the perichiasmatic and interpeduncular regions.

The coronal sections of the hemispheres showed dilatation of the ventricular system. The hemispheres were swollen and wet. The head of the left caudate nucleus contained a hemorrhagic area presumably the result of needle trauma in the air study.

The microscopic examination disclosed a dense infiltration of the leptomeninges of the base with a large number of lymphocytes, plasma cells, and macrophages. Some of the pial blood vessels showed tremendous thickening with small tuberculoma formation in their walls. The majority of the leptomeningeal blood vessels showed far advanced panarteritis with necrosis of the intima. In some of the blood vessels there was an early stage of thrombus formation.

Sections taken from the hemisphere showed some rarefaction in portions of the white matter. In some areas there was complete loss of stainability of the nuclei. The small blood vessels of the white matter were distended and moderately congested. No structural vascular change besides that already mentioned and no frank encephalomalacia could be found.

The misleading localizing symptoms, the dysphasia and weakness of the right extremities were certainly indicative of involvement of the parenchyma rather than of the leptomeninges. In addition to the lack of meningeal signs clinically the first and second cerebrospinal fluid examinations failed to indicate much meningeal reaction. It wasn't until the ninth hospital day that he developed stiffness of the neck and Kernig's sign followed by diplopia and photophobia. These clinical signs of frank meningitis coincided with the later findings in the cerebrospinal fluid.

How may one explain the clinical symptoms during the first period of the illness preceding the frank meningitis? This question is quite important because it was misleading in the diagnosis. Possibly intracerebral edema had something to do with the neurological signs; there was a late stage of edema characterized by areas of tissue liquefaction. Early transient focal cerebral lesions should not rule out the possibility of tuberculous meningitis.

Doctor Rosenbaum's Diagnosis:

Tuberculous meningitis.

Clinical Diagnosis:

Obstructive hydrocephalus, post-meningitic, due to undetermined cause.

Anatomical Diagnosis:

Tuberculous meningitis.
Fibrocaseous tuberculosis of bronchial and mediastinal lymph nodes with miliary tuberculosis of spleen, liver, and lungs.
Chronic bronchitis with chronic pulmonary emphysema.
Pleural fibrosis.
Congestion of viscera.

Dr. Eugene B. Ferris: It seems to me, keeping in mind the negative guinea pig, that this patient didn't have tuberculous meningitis until after the seventh day. Something happened that let tuberculosis into the subarachnoid space some time between the seventh and eleventh days.

Dr. Rosebaum: It is relatively well known* that meningeal tuberculosis may occasionally evolve slowly, acute meningitic symptoms are absent and localizing brain signs compose its main features. Increased intracranial pressure or internal hydrocephalus may be present as was the case in this patient. The course in these cases is subject to remissions and it has been thought that the "cures" reported probably belong to this specific class of cases.

It is a little difficult for me to understand Doctor Scheinker's interpretations of the signs in this case. The hemiparesis of one day's duration and the dysphasia lasting 30 minutes may have been on the basis of some type of neurophysiological disturbance. It may have been vasospasm, but I do not want to stress this as a possibility. Possibly the transient neurological dysfunctions may have been manifestations of migraine, or they may represent some type of seizure. I consider it the more likely that this man had two focal fits, very likely of the negative type (Jackson), thence focal signs receded quickly.

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The Fear-Allaying Effect of Pentothal Sodium in Electro-Shock Therapy*

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Electro-shock therapy is now considered the most acceptable form of shock therapy in the psychoses, especially in depressions,[1] because it is simple to apply, easily controlled, essentially free from danger, and because it immediately induces unconsciousness, which minimizes antagonism and fear on the part of the patient. In spite of these advantages one occasionally encounters a patient who, after taking several treatments, refuses to continue because of a fear aroused by some element involved in the experience. One patient will suddenly become fearful of the "machine," another will shudder when the electrodes are applied, still others become panic stricken when they learn that electricity is employed and refuse cooperation in spite of all reassurance.

Quite a number of patients who had already shown marked improvement, developed this fear and it became necessary to modify the therapy in order that treatment could be continued. The need for modification became particularly pressing since several patients, after showing initial improvement, had relapsed into their former states upon discontinuing treatment. It was thought that a preliminary induction of narcosis would be helpful and, after trial, it was found that pentothal sodium served admirably for this purpose.

The following case report is an example of how this method is used:

Case Report: A. M., white female, 42 years old, was first seen in September, 1944. She was sad and tearful and had no appetite. She had lost seventeen pounds, was suffering from disturbed sleep, had become sexually frigid, lacked the ability to concentrate, experienced loss of interest in her surroundings and had been interrupted in a suicide attempt. The content of her thoughts was limited to self depreciation and hopelessness especially after a series of nine electro-shock treatments extending over a period of three weeks which she had been given four months previously. Her present state of depression represented a relapse from an illness evidenced in May 1944, the symptoms of which had subsided after a short course of electro-shock therapy.

Because no psychogenic factors could be elicited, the patient was given a series of twenty electric shocks over a period of seven weeks and again made such excellent recovery that all of her untoward symptoms disappeared. During the next few weeks the usual memory defect cleared and she got along well for several more weeks. However, she again became depressed and refused to take additional shock treatments because of fear. She was persuaded to accept a "revised" form of treatment.

On January 15, 1945 the patient was given an intravenous injection of 2.5 per cent aqueous solution of pentothal sodium, administered very slowly at a rate of one cubic centimeter per minute with the hope that narcoanalysis would contribute some psychogenic material. However, practically nothing was obtained and the patient was asleep by the time 10 cc. of the solution had been injected.

While she was asleep electrodes were applied. The patient was then allowed to recover consciousness to a point where she just began to move her arm toward her head. At this moment a current of 125 volts was administered through a duration of 0.5 sec. This resulted in a minor (non-convulsing) reaction.

She remained asleep for the usual ten minutes and upon regaining consciousness she was amnesic. Fifteen minutes later she still failed to recognize the attending physician but did recall receiving "a needle and then I forgot".

Since then this patient has received seven additional treatments at weekly intervals. During her previous series of electro-shock treatments she required a dosage of 120 volts through one second before she would have a major (convulsive) reaction. On her second

*From the Alfred Ullman Laboratory for Neuropsychiatric Research, Sinai Hospital, Baltimore, Maryland.

treatment (of this new series) she received 12 cc. of 2.5 per cent pentothal sodium to induce sleep. Again, the spontaneous raising of her arm was the indication for the closing of a current of the same intensity as that found necessary to produce a convulsion without the hypnotic drug. Interestingly enough, a major reaction was obtained.

In succeeding treatments the patient was observed for reflex responses and changes in skin resistance. It was found that as she entered deeper states of narcosis the skin resistance dropped from an initial 200 OHMS to a low of 175 OHMS. At this time the corneal reflex was absent. After six minutes, skin resistance began rising and when it reached 190 OHMS the corneal reflex reappeared. Thirty seconds later she made her first spontaneous movement (again by raising her arm) and the usual current was applied with the same major response.

During her last treatment, by reason of other observations[2] which demonstrated that it was safe to apply the current at a deeper stage of narcosis, the current was turned on before spontaneous motor movements returned. The intact corneal reflex was used as an indicator. Her response was now nonconvulsive in type but the disorientation characteristic of electro-shock still prevailed.

Under this revised procedure the patient never expressed fear of the treatment. As a matter of fact the details were never discussed with her. They were, however, explained to her husband who felt gratified "that something could be done" to help the patient.

DISCUSSION

The decision to use a barbiturate drug simultaneously with electro-shock was a difficult one, especially when it was recalled that both the drug and electricity in sufficient dosage can lead to respiratory paralysis. However, by assuming that suitably small doses of barbiturates act primarily infracortically and that suitably small doses of electricity when applied to the frontal skull area initiate their effect through the cortex, it was concluded that the combination might be tried with a fair degree of safety.

Furthermore, the choice of barbiturate was important. A rapidly effective and very short acting hypnotic was required so that the patient could be sufficiently asleep to remain unaware of the application of electrodes and thereafter rapidly ascend to a level of consciousness where the current could be applied with a feeling of safety. Pentothal sodium is ideal for this purpose. It has the additional advantage upon slow administration of evoking through "narco-analysis" withheld psychogenic material.[3]

With the absence of fear this patient willingly returned for each treatment. By reason of the relatively long intervals between the treatments (weekly) very little memory defect has been observed. Treatment given at this frequency, after the acute manifestations of illness have passed, may be considered a sustaining dose since it maintains a patient who has once favorably responded but who tends to relapse, practically free from psychotic symptoms. As a matter of fact several similarly relapsing patients now under treatment had received earlier series of treatments in an institution only to be discharged for extramural therapy after they had shown a trend toward remission.

Since the beginning of this form of therapy a total of 24 patients have been similarly treated without any complications whatsoever. Many other interesting details have been studied and these will be evaluated and reported in a later communication.

Upon continued observation it was observed that the depth of anesthesia with pentothal can be gauged by three phenomena: (1) the corneal reflex, (2) the cutaneous reflex response, and (3) spontaneous motor activity. In very deep anesthesia all reflex and motor responses are absent. As consciousness returns, however, the corneal reflex is the first to become manifest. At a higher level of consciousness the cutaneous reflex becomes responsive. This is best tested by stroking the lower eyelid with a wisp of cotton which produces a blinking response. With the passage of time spontaneous motor movements are evident. In the case herein reported this spontaneous movement usually took the form of arm raising. In other patients, a twitch of the head or a swallow may indicate pyramidal tract release.

The application of current may be made at any depth of anesthesia. In the deeper

stage (only corneal reflex present) a previously convulsing-dose of electricity will generally result in a non-convulsing response. Where the corneal and skin reflexes are present (but no spontaneous activity is observed) a "medium reaction" to a convulsing electrical dose will be obtained. Here, the patient will respond with merely a localized convulsion of the facial musculature. In one patient, this response was manifested only by clonic twitching of the eyes to the left with dilatation of the pupils during the left-sided twitch and contraction of the pupils as the eyes returned to the midline. This observation was particularly interesting because it could be interpreted as an associated pupillary movement to unconscious eye movements so that pupils became dilated when the eyes were being directed laterally, apparently in lateral gaze toward a distant object and resumed the contracted state when the eyes returned to the midline.

If the patient is allowed to regain consciousness to the spontaneous-motor-movement stage, an electrical dose which was found to be convulsive when administered to the non-anesthetized patient, would produce a similar convulsive response in the lightly anesthetized subject.

Occasionally, after responding to an injection of pentothal sodium with deep sleep, a patient on recovering will show the corneal, then the cutaneous reflex response, but will fail to disclose spontaneous motor movements. If one intends to administer the electrical stimulus during the spontaneous motor stage it is important to remember that some patients remain motionless until they are fully awake. To permit this type of patient to reach such a stage of consciousness defeats the purpose of the anesthetic. With a little experience one learns to identify the spontaneous motor movements shortly after the cutaneous reflex is evokable. If spontaneous movements are not then observed, one may either lightly prick the face with a pin, which causes a movement of the head or one may merely call the patient's name which almost invariably brings forth a drowsy "huh?" or other oral response. The electrical stimulus is applied at that moment.

SUMMARY

Because of the development of fear for continued treatment, electro-shock therapy which had been administered to these patients was modified by the preliminary injection of pentothal sodium in dosage sufficient to induce sleep. Electrodes were then applied and the current turned on when the patient spontaneously moved a limb during the awakening process. The amount of current required to induce a convulsion was no more than that required without the use of the anesthetic. When the same intensity of current was applied at a deeper stage of narcosis, as judged by the absence of spontaneous movements but the presence of the corneal reflex, a minor (non-convulsive) reaction was obtained. However the clinical effects so far as the maintenance of the improved state is concerned, were equally satisfactory. It is believed that sleep - electro - shock therapy as herein described may be used with advantage on patients who fear the orthodox electric shock method.

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